

$$\frac{}{\Gamma \vdash \text{true} : \text{bool}} \quad \frac{}{\Gamma \vdash \text{false} : \text{bool}}$$

$$\frac{n \in \mathbb{Z}}{\Gamma \vdash n : \text{int}} \quad \frac{}{\Gamma \vdash [] : \alpha \text{ list}}$$

$$\frac{\Gamma \vdash e_1 : \text{int} \quad \Gamma \vdash e_2 : \text{int}}{\Gamma \vdash e_1 + e_2 : \text{int}} \quad \frac{\Gamma \vdash e_1 : \text{int} \quad \Gamma \vdash e_2 : \text{int}}{\Gamma \vdash e_1 - e_2 : \text{int}}$$

$$\frac{\Gamma \vdash e_1 : \text{int} \quad \Gamma \vdash e_2 : \text{int}}{\Gamma \vdash e_1 * e_2 : \text{int}} \quad \frac{\Gamma \vdash e_1 : \text{int} \quad \Gamma \vdash e_2 : \text{int}}{\Gamma \vdash e_1 / e_2 : \text{int}}$$

$$\frac{\Gamma \vdash e_1 : \alpha \quad \Gamma \vdash e_2 : \alpha}{\Gamma \vdash e_1 = e_2 : \text{bool}}$$

$$\frac{\Gamma \vdash e_1 : \alpha \quad \Gamma \vdash e_2 : \alpha \text{ list}}{\Gamma \vdash e_1 :: e_2 : \alpha \text{ list}}$$

$$\frac{\Gamma \vdash e_1 : \text{bool} \quad \Gamma \vdash e_2 : \alpha \quad \Gamma \vdash e_3 : \alpha}{\Gamma \vdash \text{if } e_1 \text{ then } e_2 \text{ else } e_3 : \alpha}$$

$$\frac{\Gamma(e_1) = \alpha}{\Gamma \vdash e_1 : \alpha} (\text{monomorphic}) \quad \frac{\Gamma(e_1) = \forall \tau_1 \dots \tau_n. \alpha}{\Gamma \vdash e_1 : \alpha[\vec{\tau}/\vec{\mu}]} (\text{polymorphic})$$

$$\frac{\Gamma \vdash e_1 : \alpha \rightarrow \beta \quad \Gamma \vdash e_2 : \alpha}{\Gamma \vdash e_1 e_2 : \beta}$$

$$\frac{\Gamma \vdash e_1 : \alpha \quad \tau_1 \dots \tau_n = \text{FV}_\Gamma(\alpha) \quad \Gamma, v : \forall \tau_1 \dots \tau_n. \alpha \vdash e_2 : \beta}{\Gamma \vdash \text{let } v = e_1 \text{ in } e_2 : \beta}$$

( $\text{FV}_\Gamma(\alpha)$ :  $\alpha$  中で自由な型変数で  $\Gamma$  内の変数型に自由変数として現れていないものの列)

$$\frac{\Gamma, v : \alpha \vdash e_1 : \alpha \quad \tau_1 \dots \tau_n = \text{FV}_\Gamma(\alpha) \quad \Gamma, v : \forall \tau_1 \dots \tau_n. \alpha \vdash e_2 : \beta}{\Gamma \vdash \text{let rec } v = e_1 \text{ in } e_2 : \beta}$$